P/N 145824

CAMBRIDGE ELECTRONICS LABORATORIES

===*Preliminary* June 23, 199[illegible]

BLACK MAGIC TELEPHONE RINGING GENERATOR -- MICRO SQUARE WAVE MODEL NU BMR

==========OPERATING CHARACTERISTICS==========

Specification		----Value----		Remark
Input voltage	(V_{dc})	5	12	5 V unit operate: 4.4-6 V 12 V unit operate: 11-14 V Custom voltages 3-15 available on special order
>*INPUT NOT PROTECTED AGAINST REVERSE POLARITY*<				
Idle current	(mA)	~190	~100	
Output voltage	(V_{rms})	-----86-----		Custom voltages available on special order
Output power	(W)	5	5	Intermittent duty
Output frequency	(Hz)	---20± 0.5---		Custom frequencies available on special order
Load regulation	(%)	----± 15----		
Efficiency	(%)	~50/~70/~80		At loads 1 W/3 W/5 W
Operating temp.	(° C)	-10-->+70		Wider temperature range available on special order
Storage temp.	(° C)	-10-->+85		
Hi-pot test	(1500 V_{dc})	Input-->output		

==========NOTES==========

(1) Standard models are encapsulated in Hoechst Alpolit UP 240 BS, an unsaturated poly ester resin which performs well at normal temperatures but which exhibits cracking below -15 ° C. Epoxy encapsulant UL-rated 94 V0 (Emerson & Cuming 2651-FR), available on special order as part number NU-BMR/UL _ V, performs well to -25 ° C. Applications requiring lower temperatures or rapid rates of temperature change may be well served by Tracon 3143 which may be ordered as part number NU-BMR/WT _ V. CEL does not warrant the merchantability or fitness for a particular use of any encapsulants but will be pleased to furnish "on approval" samples for customer testing against his exact requirement.

(2) Output may be filtered to reduce potentially interfering harmonics and/or to meet Bellcore crest-factor criteria if relevant to application. Standard units provide two-state (±) output. To facilitate filtering with physically small components, units are available with three-state output (+/0/-); the zero-state output ("dead time") is available with periods of 10% and 25%. Refer to the addendum to this datasheet, to CEL's publication *Telecom Design Tricks* and to Datasheet "Appropriate Wave-Shaping Filters for Micro and Mini Black Magic Telephone Ringing Generators."

(3) Output is *NOT PROTECTED* against shorts; circuit must have series resistance of at least 300 Ω, normally part of ring trip circuit. If the latter's current sensing resistor is less than 300 Ω, additional resistance must be added. Output is protected against transient overvoltages by internal zener clamp. Conditioning may be required for highly inductive loads.

(4) Output will pass d.c. ring trip bias only when unit is powered.

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PHYSICAL CHARACTERISTICS AND MECHANICAL SPECIFICATIONS

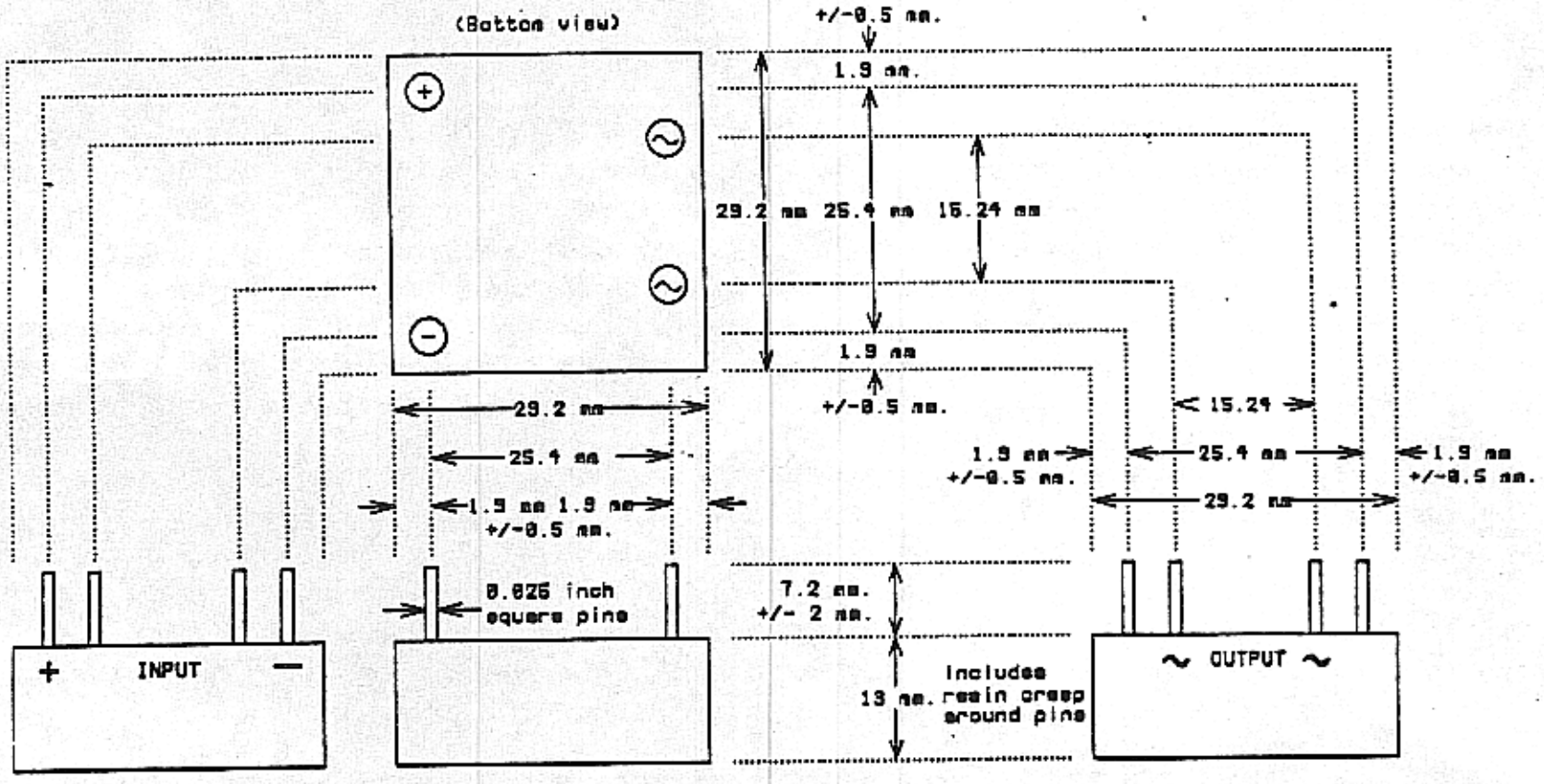
==========PHYSICAL CHARACTERISTICS==========

Dimensions mm (in)

Dimensions			Terminal spacing	
Height	12.7	(0.50)	Output	15.24 (0.6)
Width	29.2	(1.15)	Input	25.40 (1.0)
Length	29.2	(1.15)		

Weight: 20 grams (0.7 oz)

==========MECHANICAL SPECIFICATIONS==========



/NUBMR95.PIX

==========CONSTRUCTION AND MOUNTING==========

Black Magic Micro square wave ringing generators are monolithically encapsulated in water-proof resin (Model NU-BMR) or UL 94 V0-rated epoxy (Models NU-BMR/UL and /WT) with terminals as 0.025 inch square pins. Units are intended for direct solder-down to pcb or they may be socketed with receptacles e.g. any receptacle using Mill-Max clips #16 or #47.